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European Technical Assessment

ETA 22/0344 of 25/11/2022

General Part

Technical Assessment Body issuing the ETA: Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)	
Trade name of the construction product:	**Transflex TR50 to Transflex TR180** Mat expansion joints for road bridges
Product family to which the construction product belongs	Circulation Fixtures: Road Equipment
Manufacturer:	**Trelleborg Izarra, S.A.U.** C/Sierra de Algodonales, 12-14 Arganda del Rey (Madrid) – Spain https://www.trelleborg.com
Manufacturing plant(s):	Pol. Ind. Landaverde Kalea San Vicente, 23A Álava - Spain
This European Technical Assessment contains	12 pages
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 120110-00-0107 Mat expansion joints for road bridges.

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Specific parts

1. Technical description of the product

Transflex TR50 to Transflex TR180 (Transflex TR hereinafter) mat expansion joints for road bridges are made of a prefabricated elastomeric mat based on a vulcanized elastomer (based on NR) with metallic reinforcements. The elastic properties of the mat allow the expected movements of the structure. The mat surface is levelled with the running surface and carries the traffic loads to the bridge. The movement is allowed by the deformation of the mat.

The elastomeric mat is fixed to the bridge structure by bolts, washers and nuts.

Transflex TR are single expansion joints on the basis of shear deformation according to EAD 120110-00-0107 terminology, according to Figure 1a of EAD 120110-00-0107.

Transflex TR mat expansion joints are kits consisting of the following components:
- An elastomeric element reinforced with a bridging plate and L-brackets
- An anchorage system formed by bolts, washers and nuts

The family of Transflex TR covers the following models:

- Transflex TR50
- Transflex TR80
- Transflex TR110
- Transflex TR140
- Transflex TR180

1.1 Movement capacity

The movement capacity and the maximum bridge gap of Transflex TR mat expansion joints are given in Table 1.

Table 1. Movement capacity and bridge gap of Transflex TR mat expansion joints

Joint Model	Movement capacity [mm]			Nominal GAP [mm]
	Longitudinal (1,2)	Transversal (1)	Vertical (3)	
TR50	±25	25	20	40
TR80	±40	40	20	55
TR110	±55	55	20	70
TR140	±70	70	20	85
TR180	±90	90	20	105
(1) Longitudinal and transversal movements shown in the table can be performed simultaneously				
(2) The symbol + indicates opening (tensile behaviour), while the symbol – indicates closing (compression behaviour)				
(3) The vertical movement capacity of 20 mm is the limit of the vertical offset that can be obtained occasionally. For repeated vertical movements, the limit should be 5 mm.				

Detailed information about the Transflex TR mat expansion joints appears at Annex A of this ETA.

1.2 Installation

Installation should be carried out according to the ETA holder's specifications and using the specific application instructions of the product manufactured by the ETA holder or by suppliers recognized by the ETA holder. Installation should be carried out by appropriately qualified staff, under the supervision of the technical responsible on the site and after the bitumen has been placed on the road, in order to assure the correct level of the mat with the rolling surface, and to avoid damages to the expansion joint.

The maximum slope in traffic direction is 4 %. The maximum skew angle between the axis perpendicular to the road and the longitudinal axis of the joint, covered by the assessment, is 60º in the case of cyclists and 90º in the case of pedestrians and vehicles.

The following components are not incorporated in the kit of Transflex TR: support structure, sliding plates, kerb elements, connecting devices, gutter, cover plates for footpath, transition strip and drainage devices.

1.3 Maintenance

It is necessary to properly maintain the expansion joint in order to improve its functioning. In addition, if it is intended to change the rolling surface of the road, it is necessary to remove the expansion joint prior to the execution of the work and reinstall the expansion joint afterward.

2. Specification of the intended use in accordance with the applicable EAD.

2.1 Intended use

Transflex TR mat expansion joints are intended to be used for road bridges in the following conditions:

- Operating temperature categories, defined as the shade air temperature according to EN 1991-1-5, clause 1.5.2
    - Levels of minimum operating temperature: -30ºC
    - Levels of maximum operating temperature: + 45ºC

- Use categories specified with regard to the user and action categories:
    - User categories: vehicles, cyclist and pedestrian
    - Action category: standard action.

2.2 Working life/Durability

The assessment methods included or referred to in EAD 120110-00-0107 allow to ensure a working life of Transflex TR above 10 years. These provisions are based on the current state of art and on the knowledge and experience currently available.

The provisions made in this European Technical Assessment are based on a working life category of 10 years for expansion joints for road bridges. To ensure this working life special attention shall be paid in regard to the design, installation, appropriate use, and maintenance. The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative, nor EOTA when drafting this EAD, nor by the Technical Assessment Body issuing this ETA, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

3. Performance of the product and references to the methods used for its assessment

3.1 Essential characteristics of the product

This European Technical Assessment for the product Transflex TR is issued on the basis of relevant data, that have been deposited at IETcc, and identification of the product that has been assessed and judged.

The assessment of the performance of the product Transflex TR described in this document has been made in concordance with the EAD 120110-00-0107, Mat Expansion Joints for Road Bridges

The assessment for the intended use was carried out according to the Basic Work Requirements (BWR) according to EAD 120110-00-0107. The characteristics of the components shall correspond to the respective values laid down in Tables 2, 3 and 4 of this ETA, checked by IETcc.

3.1.1 Mechanical resistance and stability (BWR 1)

Table 2. Basic Work Requirements 1: Mechanical resistance and stability

Essential characteristic	Assessment method	Performance (level, class or description)
Mechanical resistance	EAD 120110-00-0107 clause 2.2.1	See clause 3.2
Resistance to fatigue	EAD 120110-00-0107 clause 2.2.2	See clause 3.3
Seismic behaviour	EAD 120110-00-0107 clause 2.2.3	Not Performance Assessed
Movement capacity	EAD 120110-00-0107 clause 2.2.4	See clause 3.4 and table 1 of EAD
Cleanability	EAD 120110-00-0107 clause 2.2.5	Cleanable
Resistance to wear	EAD 120110-00-0107 clause 2.2.6	See clause 3.5
Watertightness	EAD 120110-00-0107 clause 2.2.7	Watertight
Durability	EAD 120110-00-0107 clause 2.2.8	See clause 3.6

3.1.2 Hygiene, health and environment (BWR 2)

Table 3. Basic Work Requirements 2: Hygiene, health and environment

Essential characteristic	Assessment method	Performance (level, class or description)
Content, emission and/or release of dangerous substances	EAD 120110-00-0107 clause 2.2.9	The product neither releases nor emits dangerous substances

The manufacturer agrees to provide, upon request, information relating to hygiene and safe handling of the product.

3.1.3 Safety and accessibility in use (BWR 3)

Table 4. Basic Work Requirements 4: Safety and accessibility in use

Essential characteristic	Assessment method	Performance (level, class or description)
Ability to bridge gaps and levels in running surface	EAD 120110-00-0107 clause 2.2.10	See clause 3.7
Skid resistance	EAD 120110-00-0107 clause 2.2.11	Not Performance Assessed
Drainage capacity	EAD 120110-00-0107 clause 2.2.12	Not Performance Assessed

3.2 Mechanical resistance

The static assessment of the mechanical resistance has been performed under the following conditions considered in the EAD:

An envelope of 100% load level with 100% of the maximum opening position has been used.

Load Model 1 with an adjujstment factor $\alpha_{Q1} = 1.0$
The partial load factors used in order to stablished the load were:
$\gamma_{Gi} = 1.35$; $\gamma_{Qi} = 1.35$

The combination factors used were:
$\Psi_{0T} = 1$; $\Psi_{0d} = 1$; $\Psi_{0lk} = 0.5$; $\Psi_{0tk} = 0.5$;

Applying this load, the maximum displacement was 3.8 mm

After the load was applied, the recovery time was 75 min.

As a result of the evaluation of the mechanical resistance, the requirements of the EAD are met.

3.3 Resistance to fatigue

Fatigue load due to traffic for a working life of 10 years has been considered for the assessment of the resistance to fatigue caused by traffic loads on the expansion joint, in accordance to EAD 120110-00-0107. A contact pressure of 1.0 MPa and the envelope approach (vertical and horizontal loads simultaneously applied) are considered, resulting 1.44 million of load cycles.

As a result of the evaluation of the resistance to fatigue caused by traffic loads, the requirements of the EAD are met.

3.4 Movement capacity

The movement capacity of the expansion joints has been assessed. As a result, the maximum reaction forces, recorded for the maximum longitudinal and transversal displacement of each model and the maximum relative displacements found during the test, can be found in Table 5, as follows:

Table 5. Movement capacity: Maximum reaction force and maximum relative displacement

Expansion joint	Maximum reaction force in the longitudinal direction [kN] (1)	Maximum reaction force in the transversal direction [kN] (1, 2)	Maximum vertical relative displacement (mm)
Transflex TR50	35.0	21.4	2.24
Transflex TR80	90.3	52.7	2.48
Transflex TR110	111.0	69.6	4.84
Transflex TR140	108.0	65.9	4.06
Transflex TR180	107.0	72.9	7.01
(1) In each expansion joint, a total of 12 anchors clamp the joint to the structure, 6 at each side of the expansion joint. (2) The maximum reaction force in the transversal direction is obtained when the expansion joint is under the maximum longitudinal movement.			

3.5 Resistance to wear

The resistance to wear takes into account the next three resistances:

- Resistance due to traffic loads: Assessed by a full-scale test, according to EAD 120110-00-0107 clause 2.2.2. At the end of the test, no damage, debonding, abrasion on the mat appeared and the anchorage system had a normal behaviour. The requirements of the test were met.
- Resistance to movements caused by the bridge: Assessed by a full-scale test, according to EAD 120110-00-0107 clause 2.2.2 and Annex C of EAD 120109-00-0107. After the test, no debonding or abrasion appeared and good behaviour of the anchorage was found.
- Resistance to abrasion according to ISO 4649: Not assessed.

3.6 Durability

3.6.1 Corrosion

Atmospheric corrosivity categories for permanent steel bolts, washers and nuts according to EN ISO 9223 are shown in Table 6.

Table 6. Atmospheric corrosivity categories for permanent steel bolts, washers and nuts

Corrosivity category	Corrosivity	Durability [years]
C1	Very low	10 1)
C2	Low	10 1)
C3	Medium	10 1)
C4	High	4.7
C5	Very high	2.4
CX	Extreme	--

1)Working life of mat expansion joints for road bridges is limited to 10 years according to EAD 120110-00-0107 section 1.2.2

Corrosion protection for bridging plate and L-brackets are not relevant because they are totally embedded in the elastomer.

3.6.2 Chemicals

The resistance to de-icing salts for the mat meet the requirements stated in the EAD.

3.6.3 Loss of performance due to ageing

- Resistance to ageing from temperature: mat meet the requirements stated in the EAD.
- Resistance to ageing from ozone: mat meet the requirements stated in the EAD.
- Resistance to freeze thaw: not relevant for elastomeric materials.

3.7 Ability to bridge gaps and levels in running surface

The ability to bridge gaps and levels in running surface for the unloaded condition was assessed by analysis of the technical file for the maximum skew angle of 60º in the case of cyclists and 90º in the case of pedestrians and vehicles.

The level differences in the running surface due to gaps and voids are less than 5 mm for the unloaded condition.

The maximum level difference in the running surface is 7 mm (except gaps and voids) for the deformed condition, but without loads.

The level differences in the running surface is 11 mm (except gaps and voids) for the deformed condition and with the service load defined at Clause 3.2. of this ETA.

The expansion joint has no steps.

As a result of the evaluation of the ability to bridge gaps and levels in running surface, the requirements of the EAD are met.

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

According to the decision 2001/19/EC of the European Commission[1], system 1 of assessment and verification of constancy of performance (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) Nº 305/2011) applies.

[1] Published in the Official Journal of the European Union (OJEU) L201 of 17 of July of.1998, page 112. See www.new.eur-lex.europa.eu/oj/direct-access.html

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at IETcc[2].

For type testing, the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases, the necessary type testing has to be agreed between IETcc and the notified body.

Issued in Madrid on 25th of November 2022

By

Firmado por CASTILLO TALAVERA ANGEL - DNI 52507605P
Fecha: 02/12/2022 07:15:09 CET

Director
on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc – CSIC)

[2] The Control Plan is a confidential part of the ETA and only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

ANNEX A: DESCRIPTION OF TRANSFLEX TR EXPANSION JOINTS

A.1. Figures with detailed cross sections of the Joints

The detailed cross section of each Transflex TR mat model joint are given in the figures below:

Figure A.1. Cross section of Transflex TR50

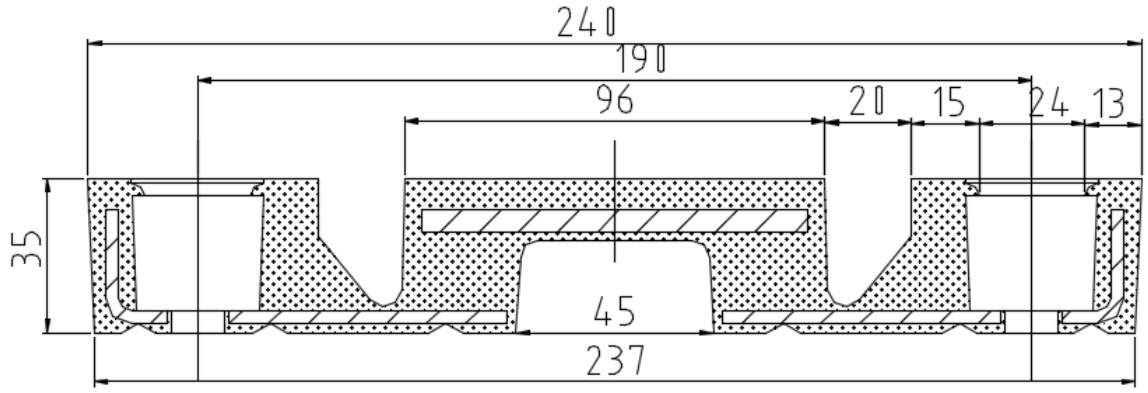


Figure A.2. Cross section of Transflex TR80

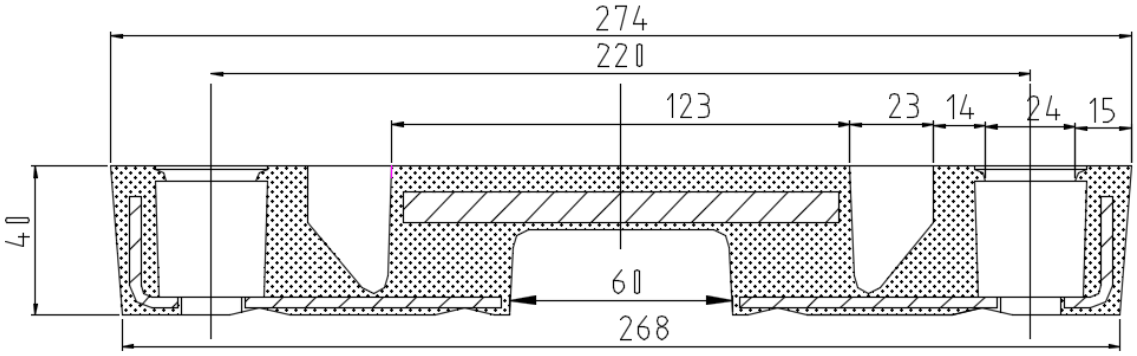


Figure A.3. Cross section of Transflex TR110

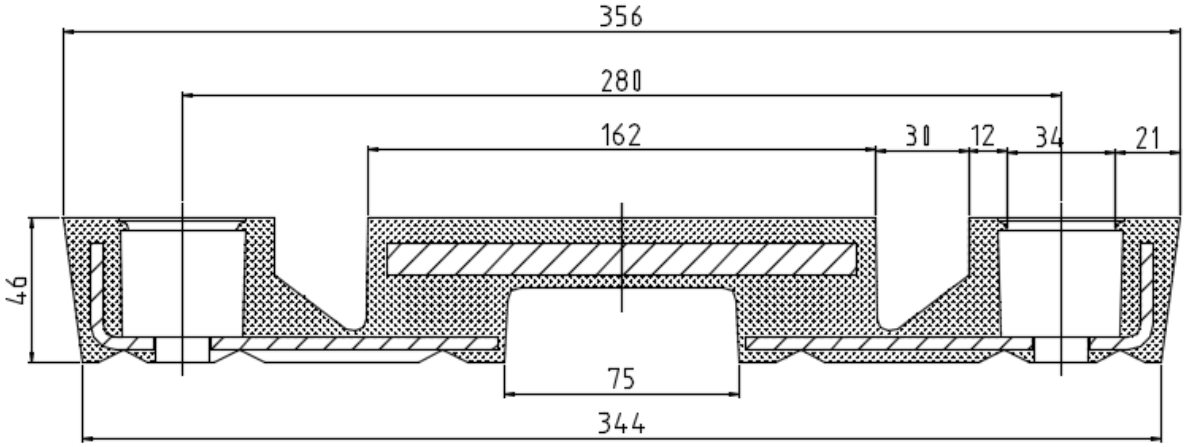


Figure A.4. Cross section of Transflex TR140

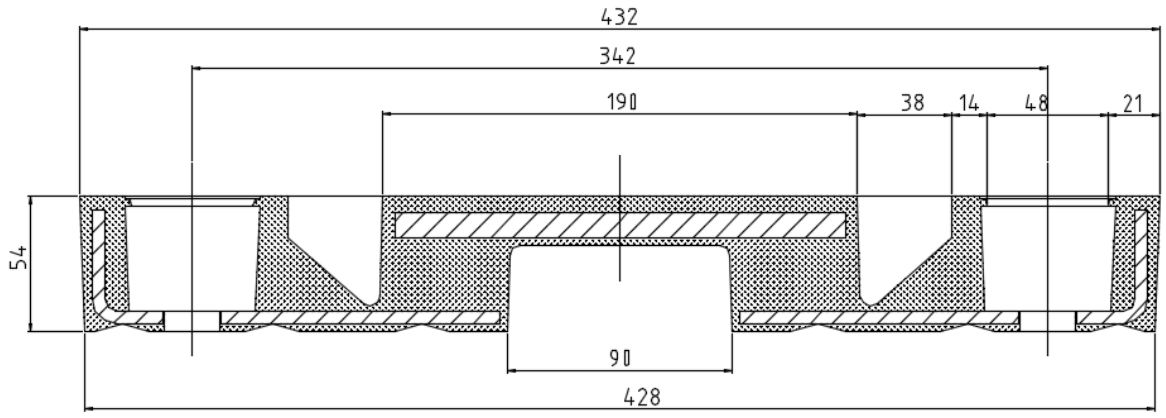
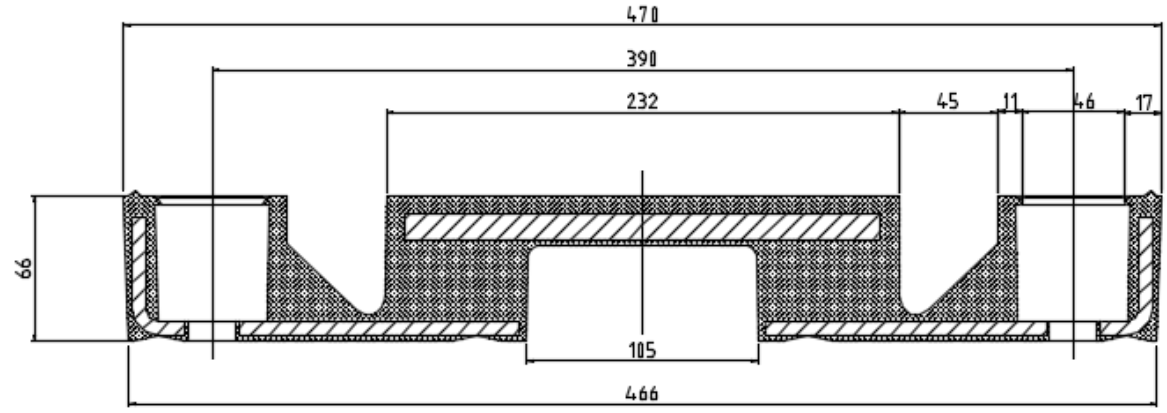


Figure A.5. Cross section of Transflex TR180



A.2. List of the components of Transflex TR expansion joints

Transflex TR mat expansion joints consist of the following components:

A.2.1 Elastomeric mat

Elastomeric mat is based on vulcanized elastomer (Natural Rubber -NR-).

A.2.2 Metallic reinforcements

Metallic reinforcements within Transflex TR mat expansion joints are the bridging plate and the L-brackets. The bridging plate are formed of Steel of grade S355 JR and the L-brackets of S275 JR, according to EN 10025

A.2.3 Anchorage system

The anchorage of the Transflex TR mat expansion joints to the support consists of a steel element made of anchor bolts, nuts and washers. The bolt is placed into a drilled hole filled with injection resin and is anchored via the bond between metal part, injection resin and concrete. The injection resins are not part of the Transflex TR mat expansion joint kit. Characteristics and dimensions of the steel elements according to each joint model are shown below:

Table A.1. Characteristics of the Bolts

Bolts				
Model	**Strength Class**	**Thickness**	**Length (mm)**	**Thickness of electroplated zinc coated**
Transflex TR50	5.6	M12	150	10 µm
Transflex TR80	5.6	M14	150	10 µm
Transflex TR110	5.6	M14	150	10 µm
Transflex TR140	5.6	M20	200	10 µm
Transflex TR180	5.6	M20	200	10 µm

Table A.2. Characteristics of the Nuts

Nuts			
Model	**Grade**	**Dimension**	**Thickness of electroplated zinc coated**
Transflex TR50	8	M12	10 µm
Transflex TR80	8	M14	10 µm
Transflex TR110	8	M14	10 µm
Transflex TR140	8	M20	10 µm
Transflex TR180	8	M20	10 µm

Table A.3. Characteristics of the washers

Washers					
Model	**Inner Diameter (mm)**	**Outer Diameter (mm)**	**Thickness (mm)**	**Hardness**	**Thickness of electroplated zinc coated**
Transflex TR50	13	30	6	300 HV	10 µm
Transflex TR80	15	28	4.5	300 HV	10 µm
Transflex TR110	15	36	6	300 HV	10 µm
Transflex TR140	21	44	8	300 HV	10 µm
Transflex TR180	21	44	8	300 HV	10 µm